

**NOAA
FISHERIES**

**Southeast Fisheries
Science Center**

Introduction to the Southeast Stock Assessment Enterprise

Roles, Responsibilities and Partnerships

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The Acts

Magnuson-Stevens Fisheries Act
Atlantic Tuna Conservation Act



Magnuson-Stevens Sustainable Fisheries Act

Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield ...

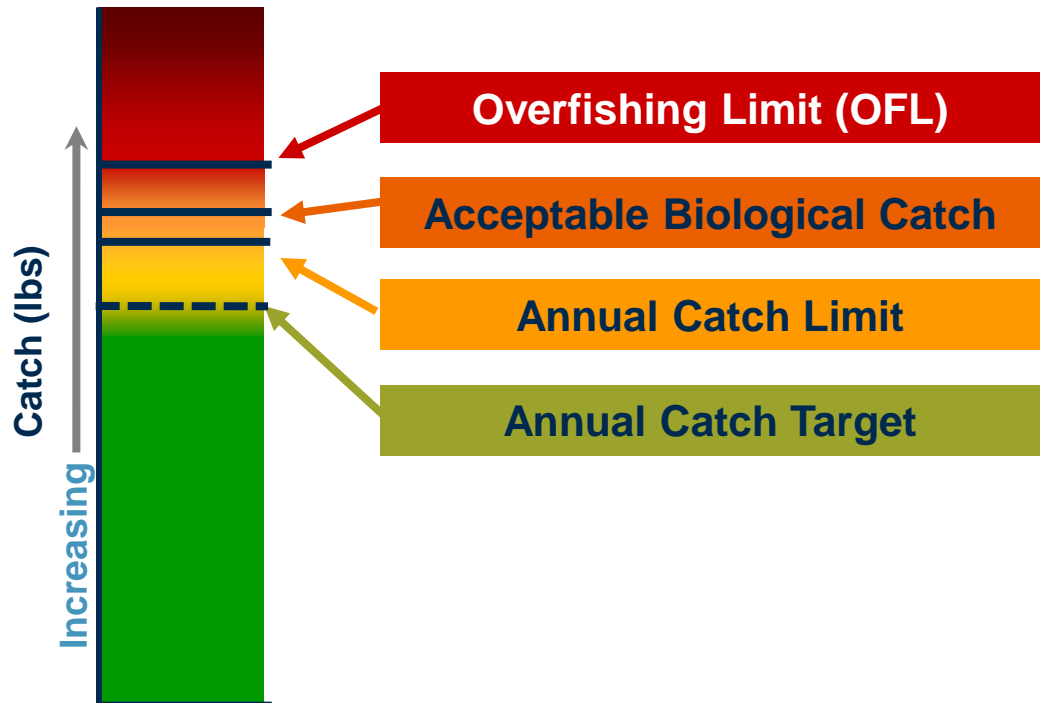
- Establishes 8 Fishery Management Councils
 - Develop annual catch limits for each managed fishery that may not exceed the recommendations of its scientific and statistical committee or peer review process
 - Conservation measures shall be based on the best scientific information available
- Administered through the U.S. Secretary of Commerce
 - Regional Offices (management)
 - Regional Science Centers (scientific advice)
- International provisions
 - Cooperate with other nations involved in fisheries for highly migratory species to ensure conservation and shall promote the achievement of optimum yield of such species throughout their range

Magnuson-Stevens Sustainable Fisheries Act

Reauthorization of 2006 (MSRA)

- Mandates use of Annual Catch Limits and Accountability Measures
- Gave the Council Scientific and Statistical Committees (SSC) a greater responsibility for estimating the acceptable biological catch

Implemented by NMFS
following revised
National Standard 1
guidelines



Magnuson-Stevens Sustainable Fisheries Act

Requires Fishery Management Plans that

- Develop conservation and management measures to **prevent overfishing and rebuild overfished stocks**
- Assess and specify the present and probable future condition of, and the **maximum sustainable yield and optimum yield** from, the fishery
- Specify objective and **measurable criteria** for identifying when the fishery to which the plan applies is overfished (with an analysis of how the criteria were determined and the relationship of the criteria to the reproductive potential of the stock)
- Establish a mechanism for specifying **annual catch limits** in the plan and implementing regulations to prevent overfishing, including measures to ensure accountability.

The Atlantic Tuna Conservation Act

To give effect to the International Convention for the Conservation of Atlantic tunas (ICCAT), signed at Rio de Janeiro May 14, 1966...

- Administered jointly through U.S. Secretary of State and Secretary of Commerce
 - Highly Migratory Species Div., International Affairs, State Department (management)
 - Regional Science Centers (scientific advice)
- Establishes ICCAT Advisory Committee
 - Equivalent to advisory role of Council SSC's, but no authority to set ABC
- No regulation ... may have the effect of increasing or decreasing any allocation or quota of fish or fishing mortality level to the United States agreed to pursuant to a recommendation of the [ICCAT]

The Players

Science

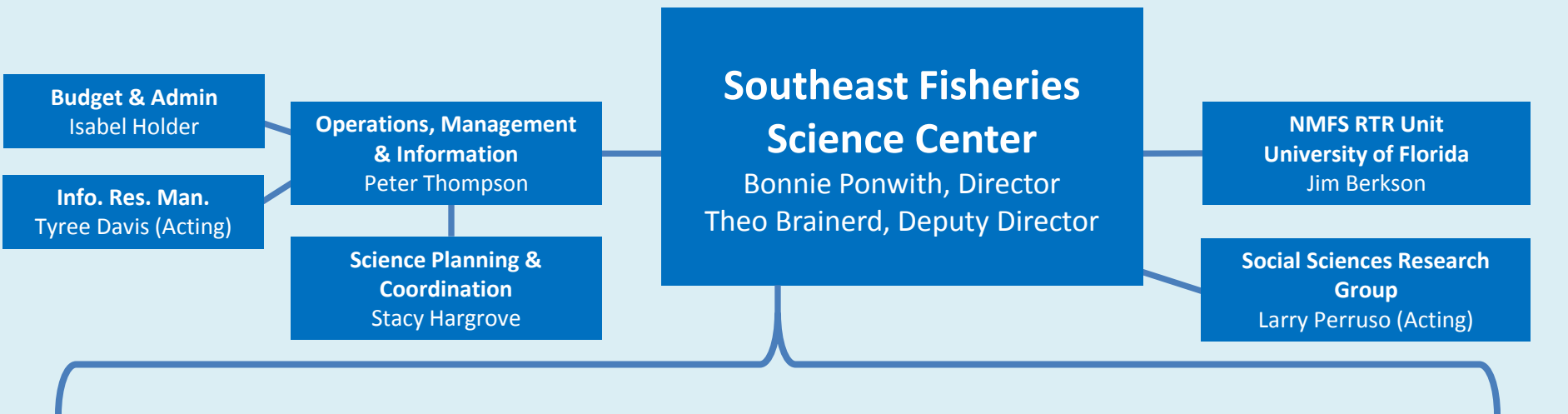
- **NOAA Southeast Fisheries Science Center**
- State Research Agencies
- Academic Partners
- ICCAT Standing Committee for Research and Statistics



Management

- **NOAA Southeast Regional Office**
- Federal Fishery Management Councils (3)
- NMFS Highly Migratory Species
- ICCAT Commission
- State Marine Fisheries Commissions (2)





Fisheries Statistics Division Steve Turner	Sustainable Fisheries Division Clay Porch	Protected Resources & Biodiversity Div. Jim Bohnsack	Mississippi Labs – Pascagoula and Stennis Lisa Desfosse	Galveston, TX & Lafayette, LA Labs Jim Nance (Acting)	Beaufort Lab. Aleta Hohn	Panama City Lab. Guy Davenport
Fisheries Monitoring: David Gloeckner	Highly Migratory Species Branch: Craig Brown	Sea Turtles Chris Sasso	Harvesting & Engineering Chris Gledhill	Fisheries Ecology Tom Minello	Sustainable Fisheries Erik Williams	Age and Growth Research Gary Fitzhugh
Fisheries Sampling Lawrence Beerkircher	Gulf and Caribbean Fisheries Branch: Shannon Calay	Marine Mammals Lance Garrison	Harvesting Systems John Mitchell	Fishery Management Jim Nance	Fisheries Ecosystem Todd Kellison	Sharks Enric Cortes John Carlson
		Benthic Ecology and Restoration Margaret Miller	Resource Surveys Terry Henwood	Protected Species Ben Higgins	Protected Species: Vacant	MPA/Deep Coral Research: Andy David
		Biodiversity Joe Serafy	Information Technology Charles Weber			
		Early Life History John Lamkin				
		Fish Assessment, Monitor., & Eco. Vacant				
		S FL Ecosystems Joan Browder				

Fishery Management Bodies



Figure 1. SEFSC's laboratory locations and jurisdictions that cover areas of responsibility for three Fishery Management Councils and Atlantic Highly Migratory Species. Inshore and coastal habitats are under the jurisdiction of eight southeastern states, Puerto Rico, and the U.S. Virgin Islands.

Federal Fishery Management Plans

SEC. 303. CONTENTS OF FISHERY MANAGEMENT PLANS

SEC. 303. CONTENTS OF FISHERY MANAGEMENT PLANS (U.S.C. 1901)

(a) REQUIRED PROVISIONS.—Any fishery management plan which is prepared by any Council, or by the Secretary, with respect to any fishery, shall—
(1) contain the conservation and management measures, applicable to fishing and fishing by vessels of the United States, which are—
(A) necessary and appropriate for the conservation and management of the fishery to permit overfishing and overfishing levels, and/or prevent, entice, and/or promote the long-term health and stability of the fishery;
(B) described in the subsection or subsection (b), or both; and
(2) consistent with the national standards, the other provisions of this Act, regulations implementing recommendations by international organizations in which the United States participates (including, but not limited to closed areas, quotas, and gear limits), and any other applicable law.

(3) contain a description of the fishery, including, but not limited to, the number of vessels involved, the type and quantity of fishing gear used, the species of fish involved and their location, the core fishery to be secured in management, actual and potential vessels from the fishery, any recreational interest in the fishery, and the nature and extent of foreign fishing and fisheries-related fishing rights, if any;
(4) assess and specify the present and probable future condition of, and the maximum sustainable yield and optimum yield from, the fishery, and include a summary of the information relied in making such specification;

(5) assess and specify—
(A) the capacity and the extent to which fishing vessels of the United States, on an annual basis, will harvest the optimum yield specified under paragraph (3);
(B) the portion of such optimum yield which, on an annual basis, will not be harvested by fishing vessels of the United States and is available for foreign fishing; and
(C) the capacity and extent to which United States fish processors, on an annual basis, will process that portion of such optimum yield that will be harvested by fishing vessels of the United States.

(6) specify the present data which shall be submitted to the Secretary with respect to commercial, recreational, charter fishing, and fish processing in the fishery, including, but not limited to, information regarding the type and quantity of fishing gear used, catch by species in numbers of fish or weight thereof, areas in which fishing was engaged in, time of fishing, number of trips, economic information necessary to meet the requirements of the Act, and the estimated processing capacity of, and the actual processing capacity utilized by, United States fish processors.

(7) contain and provide for temporary adjustment, after consultation with the Coast Guard concerning sailing the fishery, regarding access to the fishery, for vessels otherwise permitted from harvesting because of weather or other ocean conditions affecting the safe utilization of the fishery, except that the adjustment shall be made after the consent of either the fisheries or the Coast Guard, and shall be subject to the approval of the Secretary under section 303(b)(1)(A), in order to the extent practicable address effects on such habitat caused by fishing, and/or other actions to encourage the conservation and enhancement of such habitat.

(8) in the case of a fishery management plan that, after January 1, 1991, is submitted to the Secretary for review under section 303(a), including any plan for which an amendment

(1) requires a permit to be obtained from, and fees to be paid to, the Secretary, with respect to—
(A) any fishing vessel of the United States fishing, or wishing to fish, in the exclusive economic zone (or special area);² or for anadromous species in Continental Shelf fishery resources beyond the outer limit;³ or
(2) the operation of any such vessel, or

(3) any United States fish processor who first receives fish that are subject to the plan;

(4) designate zones where, and periods when, fishing shall be closed, or shall be restricted, or shall be permitted only by specified types of fishing vessels or with specified types and quantities of fishing gear;
(5) designate such zones in areas where deep-sea corals are identified under section 402, to protect deep-sea corals from physical damage from fishing gear to prevent loss or damage to such fishing gear from interactions with deep-sea corals, after considering long-term sustainable use of fishery resources in such areas; and

(6) include any provision of the Act that prohibits all fishing, means that such fishing—
(A) is based on the best scientific information available;
(B) includes criteria to assess the conservation benefits of the closed area; and
(C) establishes a timetable for review of the closed area performance that is consistent with the purposes of the closed area; and

(7) is based on an assessment of the benefits and impacts of the closure, including the benefits and impacts of other management measures alone or in combination with such measures, including the benefits and impacts of limiting access to users of the area, overall fishing activity, fishery science, and fishery and economic conservation;
(8) establish specified limitations which are necessary and appropriate for the conservation and management of the fishery or the—
(A) catch of fish, based on area, species, size, number, weight, sex, life cycle, total biomass, or other factors;

(9) take of fish caught during commercial, recreational, or charter fishing, consistent with any applicable Federal and State safety and quality requirements; and
(10) management or transportation of fish or fish products under permits issued pursuant to section 204.

(11) prohibit, limit, condition, or require the use of specified types and quantities of fishing gear, fishing vessels, or equipment for such vessels, including devices which may be required to facilitate enforcement of the provisions of this Act;

(12) incorporate (consistent with the national standards, the other provisions of this Act, and any other applicable law) the relevant fishery conservation and management provisions of the current Federal laws to the fishery and take into account the different consequences affecting fisheries from different States and regions, including distances to fishing grounds and proximity to time and area closures;

(13) establish a limited access system for the fishery in order to achieve optimum yield, if, in developing such system, the Council and the Secretary take into account—
(A) present participation in the fishery;

(B) historical fishing practices in, and dependence on, the fishery;
(C) the economics of the fishery;

submitted to the Secretary for such review) or is prepared by the Secretary, assess and specify the nature and extent of scientific data which is needed for effective implementation of the plan;

(10) include a fishery impact statement for the plan or amendment (in the case of a plan or amendment otherwise submitted to the Secretary for review) that, after January 1, 1991, which shall assess, specify, and analyze the likely effects, if any, including the cumulative climatic, economic, and social impacts, of the conservation and management measures on, and possible mitigation measures for—
(A) participants in the fishery and fishing communities affected by the plan or amendment;

(B) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants; and
(C) the safety of human life at sea, including whether and to what extent such measures may affect the safety of participants in the fishery;

(11) specify, objective and measurable criteria, for identifying when the fishery to which the plan applies is overfished (with an analysis of how the criteria were determined and the relationship of the criteria to the reproductive potential of stocks of fish in that fishery) and, in the case of a fishery which the Council or the Secretary has determined is approaching an overfished condition or is overfished, contain conservation and management measures to prevent overfishing or end or reducing and/or reduce the fishery;

(12) establish a monitoring program to monitor the current and future status of the fishery, including the following priority—
(A) monitor bycatch; and
(B) monitor the mortality of bycatch which cannot be avoided;

(13) assess the type and amount of fish caught and released alive during recreational fishing, under catch-and-release programs and the mortality of such fish, and include conservation and management measures that, to the extent practicable, minimize mortality and ensure the extended survival of such fish;

(14) include a description of the commercial, recreational, and charter fishing sectors which participate in the fishery, including its economic impact, and, to the extent practicable, quantify trends in landings of the managed fishery resource by the commercial, recreational, and charter fishing sectors;

(15) in the event that rebuilding plans or other conservation and management measures which would the overall harvest in a fishery are necessary, assess, taking into consideration the economic impact of the harvest restrictions or recovery benefits to the fishery participants in such sector, any harvest restrictions or recovery benefits fairly and equitably among the commercial, recreational, and charter fishing sectors in the fishery; and

(16) establish a mechanism for specifying annual catch limits in the plan (including a multi-year plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability;

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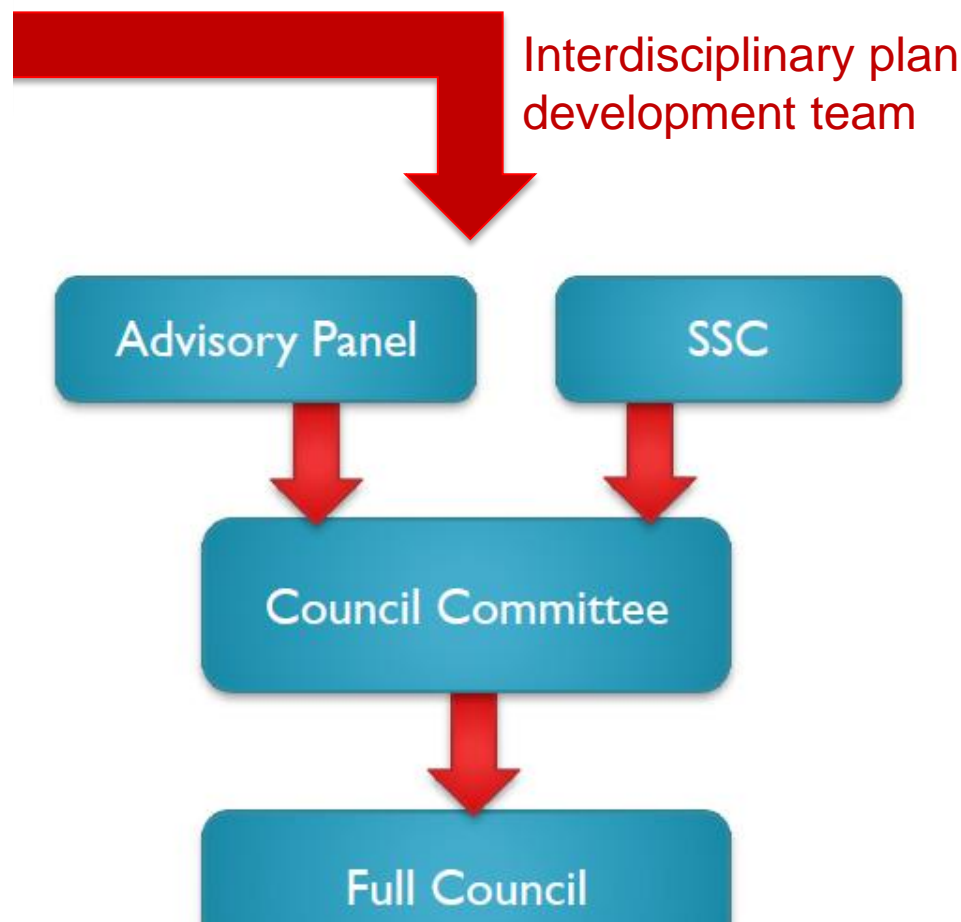
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(60) include a description of the fishery, including measures to ensure accountability;



Species in Fishery Management Plans

(that are candidates for stock assessments)

SAFMC	GMFMC	CFMC	HMS	ICCAT
68 excluding corals ecosystem components, and sargassum	40 excluding corals and species for data collection only	83 excluding species for data collection only	36 excluding 3 species assessed by ICCAT	22

42 Major Fisheries (most in the U.S.)

Fishery	SAFMC	GMFMC	CFMC	SHARKS	ICCAT
Recreational	X	X		X	
Commercial hook & line	X	X	X	X	
Bottom Longline	X	X		X	
Shrimp trawls		X		X	
Purse seine					X
Pelagic longline					X
Other surface gears (baitboat, trolling, gillnet)				X	X
Artisanal			X (varied gears)		



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Assessment Partners by FMO

SAFMC	GMFMC	CFMC	HMS	ICCAT
SEFSC	SEFSC	SEFSC	SEFSC	SEFSC
FWC	FWC			40+ Nations
SSC	SSC	SSC		SCRS

ICCAT Standing Committee on
Research and Statistics
(National Scientists, industry
and NGO-sponsored
consultants)

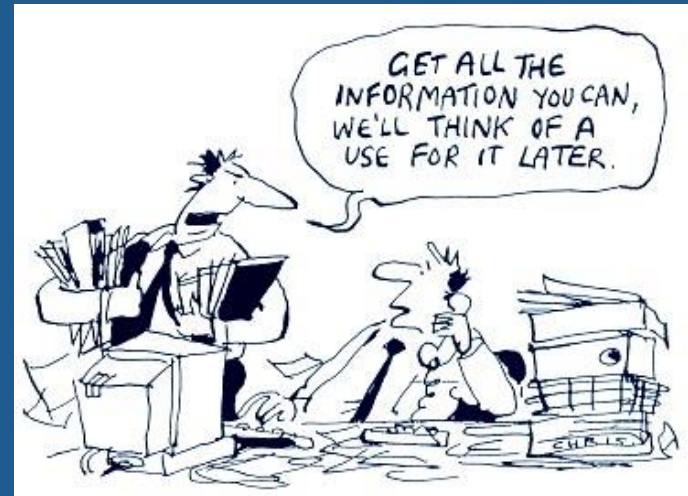
Data Partners by FMC

SAFMC	GMFMC	CFMC	HMS	ICCAT
SEFSC	SEFSC	SEFSC	SEFSC NEFSC	SEFSC NEFSC
ACCSP MARMAP	GulfFIN SEAMAP		ACCSP, GulfFIN SEAMAP,	ICCAT Secretariat
State Agencies	State Agencies	Territories (VI and PR)	State Agencies	Japan, Canada, 40+ other nations
MRIP	MRIP	MRIP	MRIP	LPS, MRIP
Universities	Universities	Universities	Universities	Universities

The Data

Fishery Statistics

- Landings
- Discards
- Size composition
- Age composition
- CPUE
- Shrimp bycatch



Fishery independent surveys

- Size composition
- Age composition
- Relative abundance indices

Fishery-Independent (FI) data

- Spatial and depth distribution limited for some data series
 - SATL: no consistent data collection in deeper water; meaning no FI data for several assessed species.
 - large sections of shelf not sampled by several surveys
- Short time series
 - e.g., SATL video data in only 4th year of operation (2010-present)
- Limited species coverage
 - e.g., Chevron trap index limited to few reef species and may not always track abundance (1990-present)
- Insufficient characterization of habitat

Fishery Data

Commercial Landings

- Annual with reliable species ID for all species after 1986
- Periodic and reliable for some species back to 1880

Commercial Discards

- Limited observer coverage
 - Little/No size or age composition data for most species
- Amounts depend on self-reported data (logbooks)

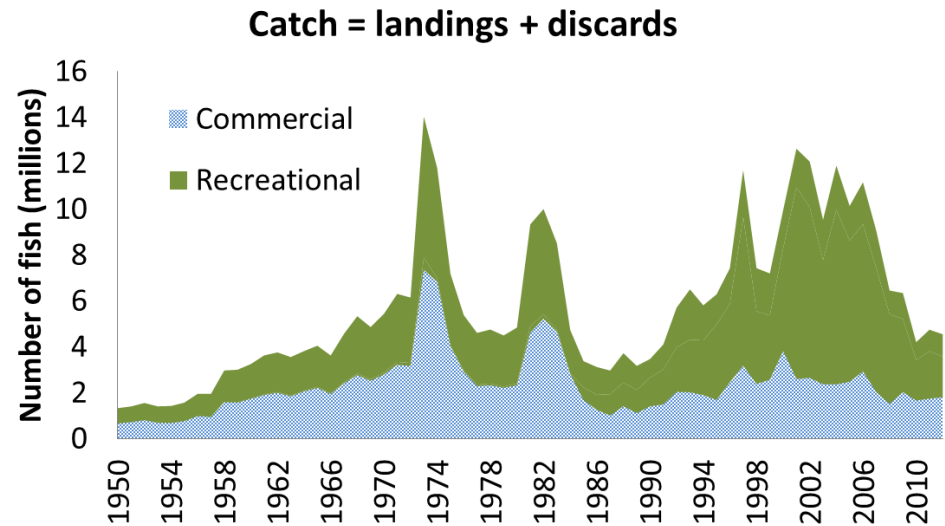
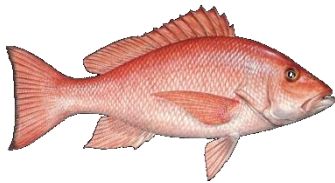
Commercial age composition

- Sample sizes too low for many species
- Possibly biased sampling of ages for some fisheries
- Insufficient age validation studies

Fishery Data

Recreational Landings and Discards

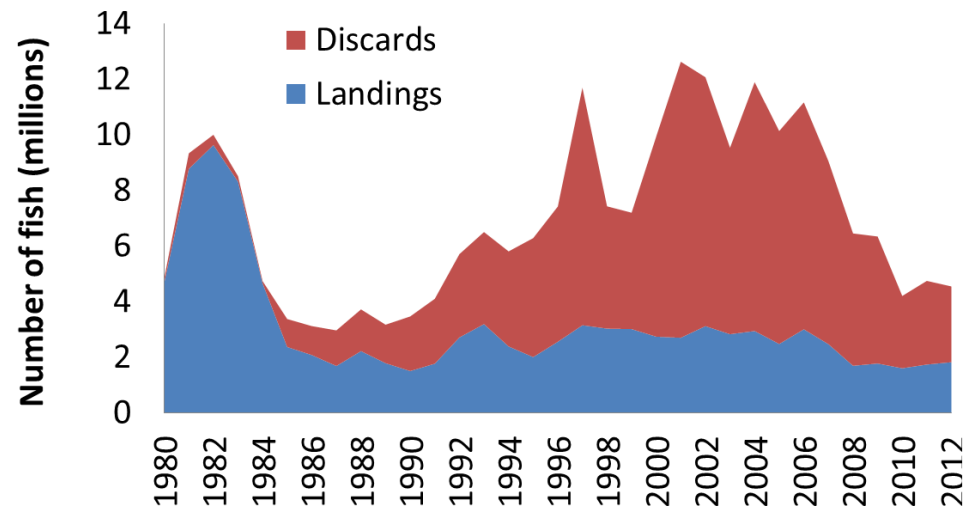
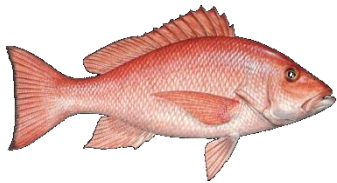
- Recreational anglers account for more than half of the total catch of many species
- CPUE based on site intercepts, but many species have low intercept rates (high CV)
- Effort based on recall (telephone survey)
- Age sampling very low
- Discards self-reported (highly uncertain and possibly biased)



Fishery Data

Recreational Landings and Discards

- Recreational anglers account for more than half of the total catch of many species
- CPUE based on site intercepts, but many species have low intercept rates (high CV)
- Effort based on recall (telephone survey)
- Age sampling very low
- Discards self-reported (highly uncertain and possibly biased)
- Discards often exceed landings



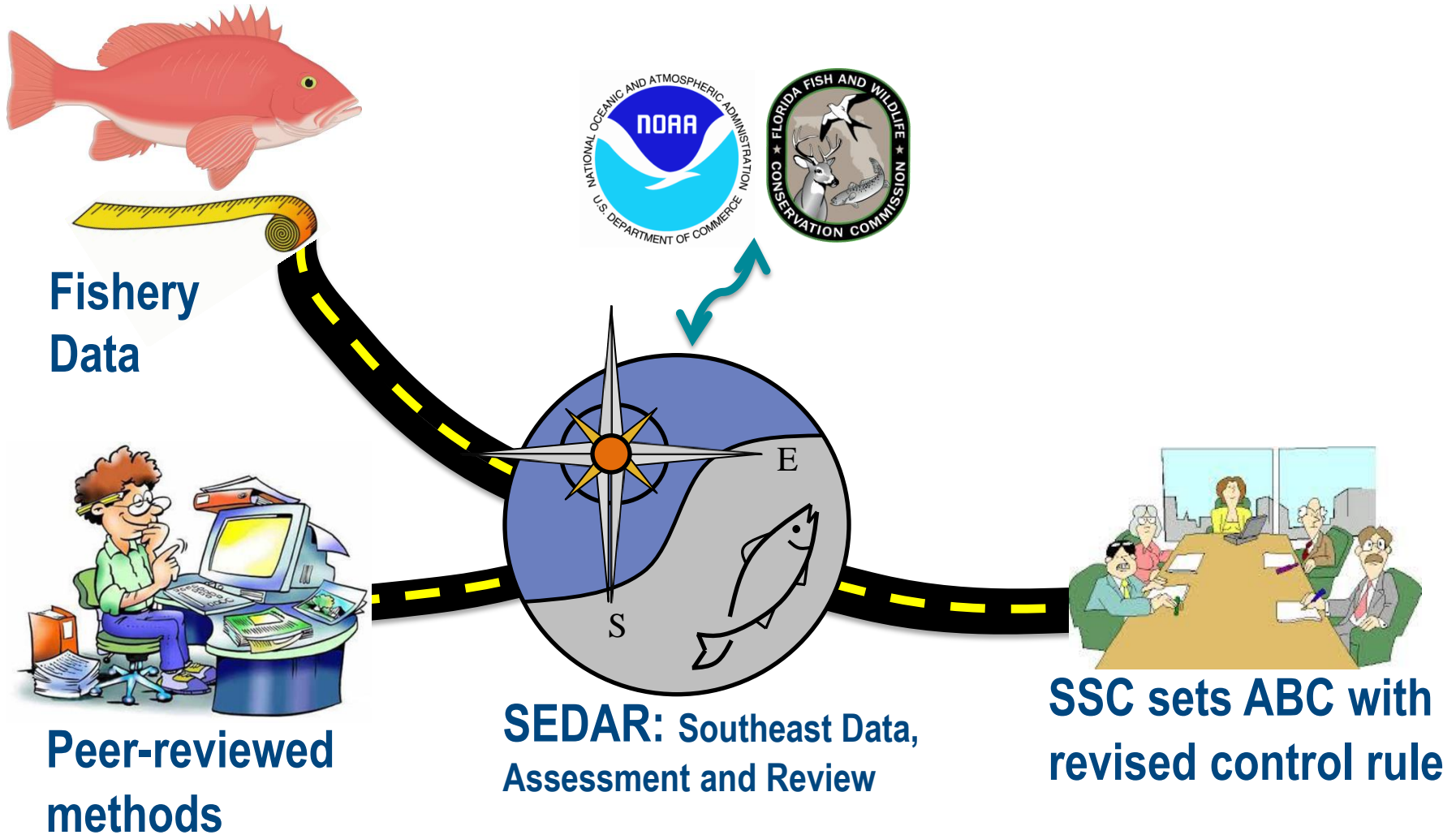
The Stock Assessments

Overview of the stock assessment process

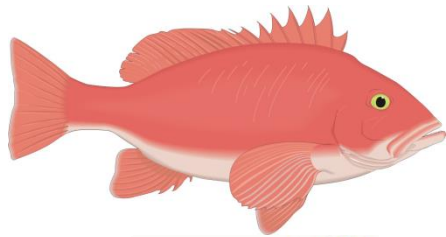
Stock assessment models

Bases of ABC advice

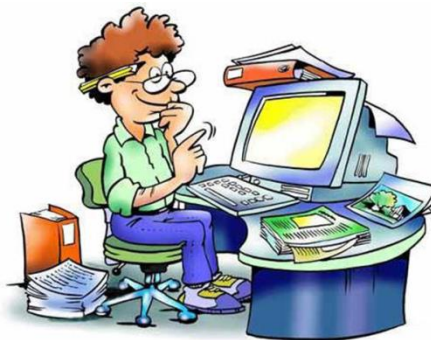
The Stock Assessment Process



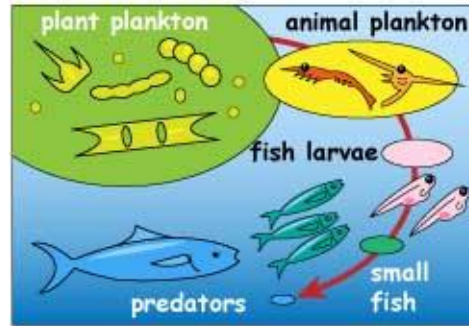
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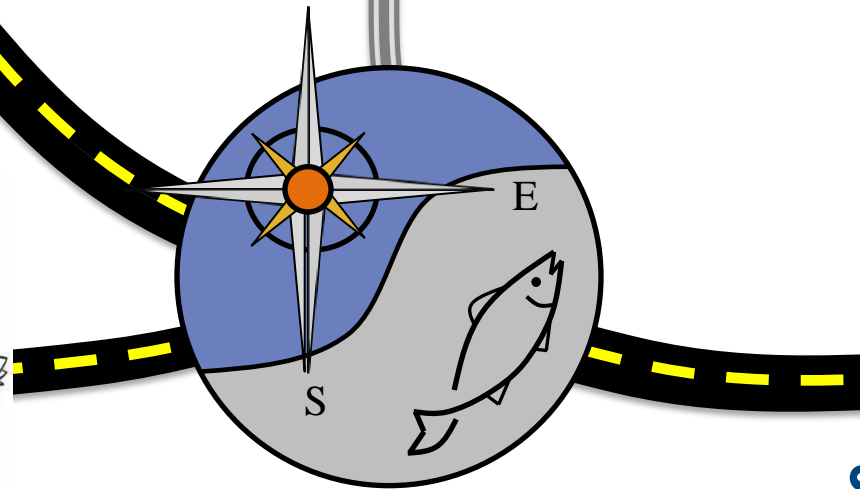
**Fishery
Data**



**Peer-reviewed
methods**



**Ecosystem
considerations**



**SEDAR: Southeast Data,
Assessment and Review**



**SSC sets ABC with
revised control rule**

Primary Stock Assessment Software

Statistical catch at age [size]

- Stock Synthesis, BAM, ASPM

Virtual Population Analysis

- VPA-2BOX (mostly ICCAT, King Mackerel)

Catch-free age-structured model

- Goliath grouper, some sharks

Production models

- ASPIC, BSP

Statistical mean-length

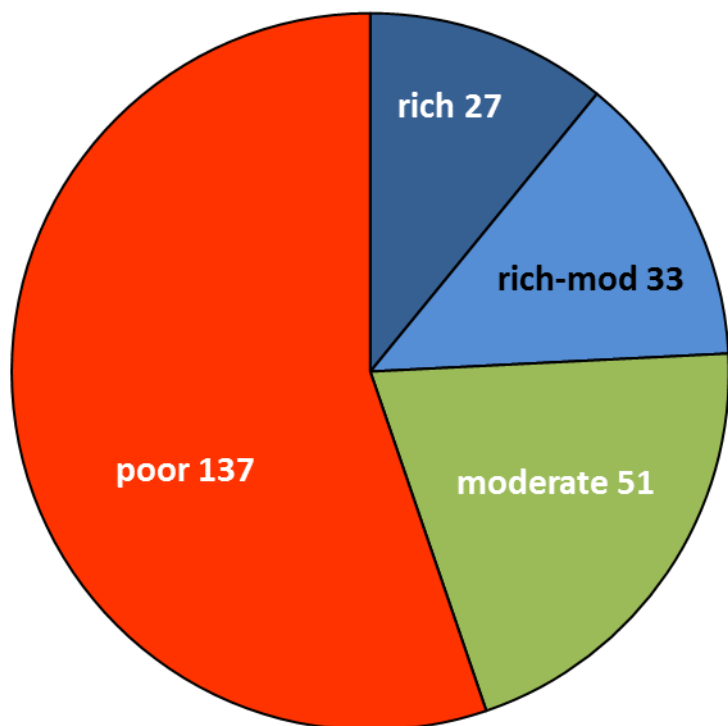
- Caribbean data poor



Data available for stock assessments

- Model choice predicated largely on data availability

All FMPs



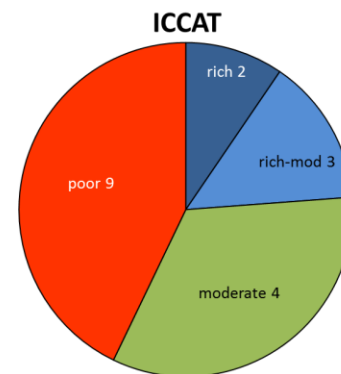
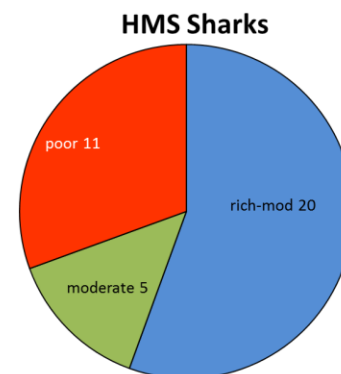
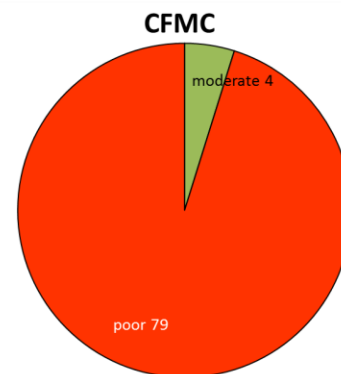
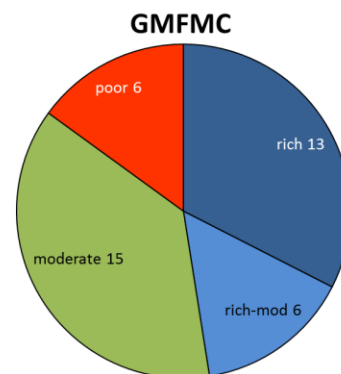
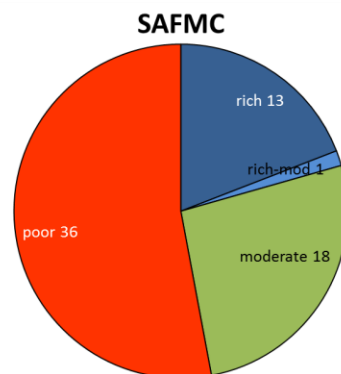
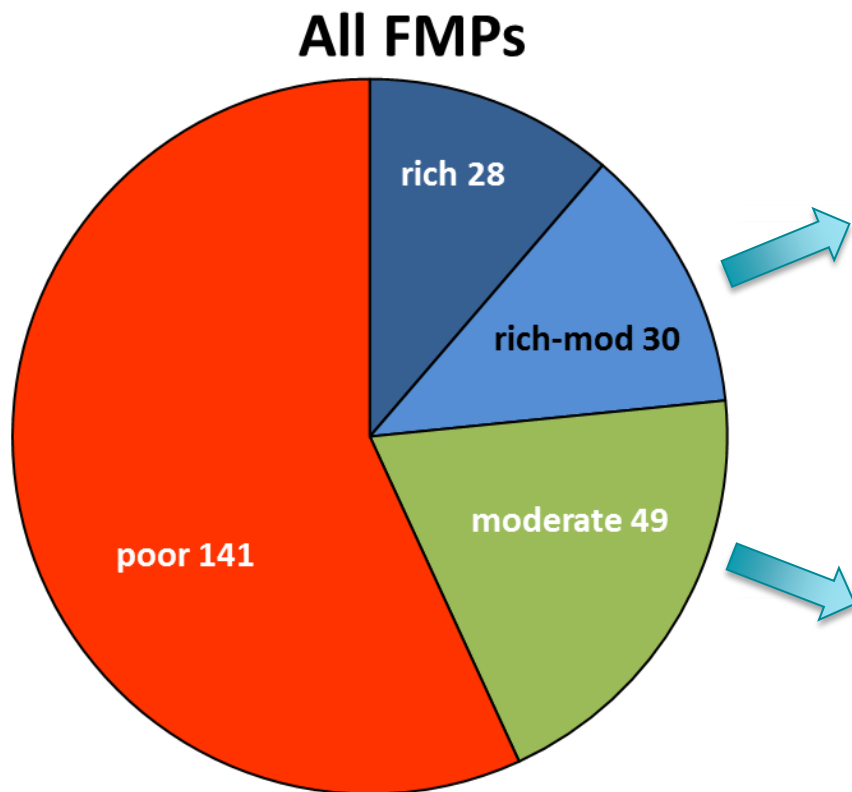
Key:

<u>Label</u>	<u>Quality of Catch, index, composition</u>
rich*	all 3 of reasonable quality
rich-mod	one or more of questionable quality
moderate	one missing or of low quality
poor	two or more missing and/or of low quality

*in this context “rich” indicates only that the data might be sufficient to support a canonical stage-structured assessment.

Provisional analyses

Data available

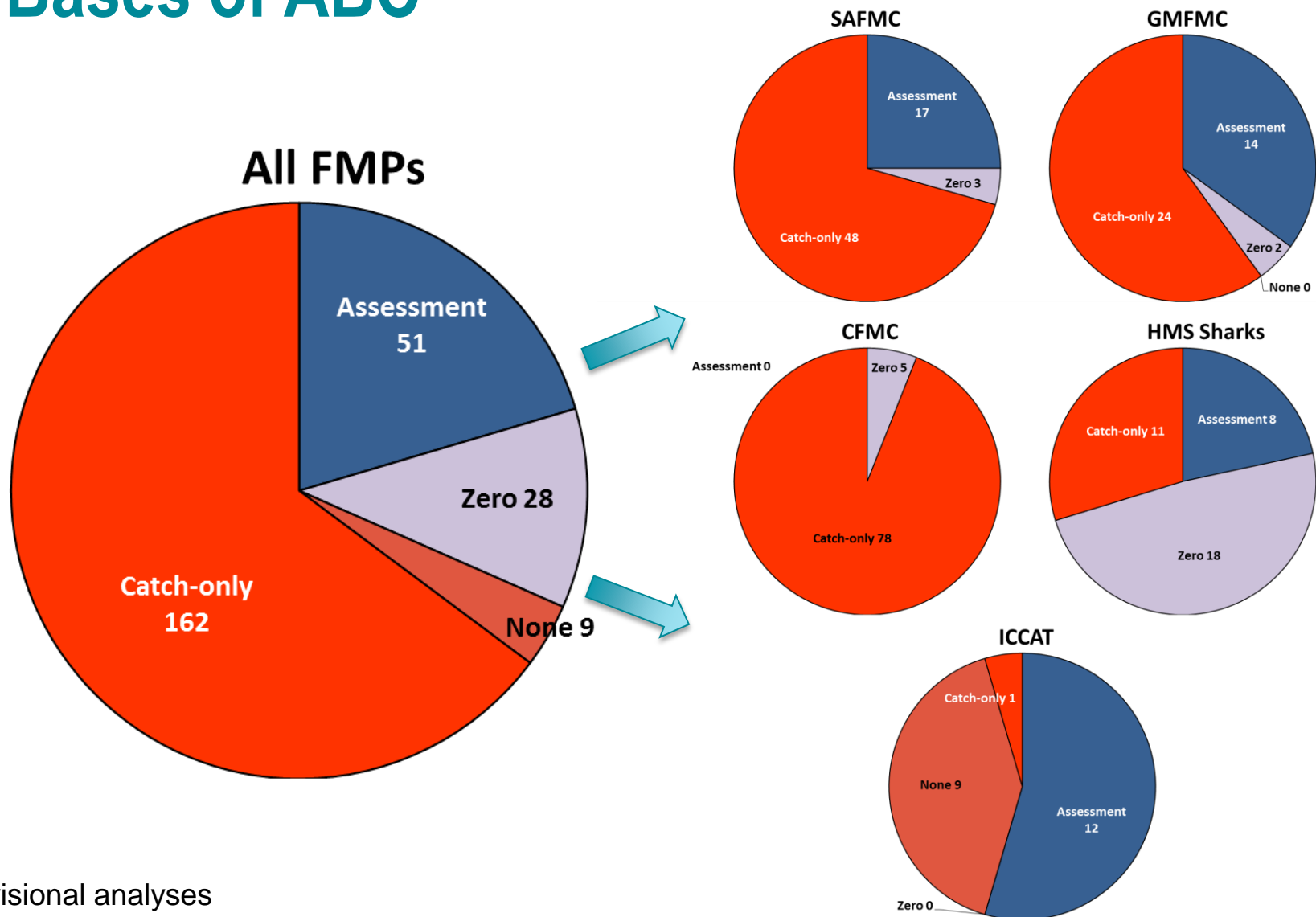


Provisional analyses



NOAA FISHERIES

Bases of ABC



Provisional analyses

Summary

Five primary management bodies (plus two commissions)

- 3 Federal Councils



- ICCAT



- NMFS Highly Migratory Species



- 2 State Commissions (GMFMC, ASFMC)



Figure 1. SEFSC's laboratory locations and jurisdictions that cover areas of responsibility for three Fishery Management Councils and Atlantic Highly Migratory Species. Inshore and coastal habitats are under the jurisdiction of eight southeastern states, Puerto Rico, and the U.S. Virgin Islands.

Many bosses...
many demands!

Summary

Five primary management bodies (plus two commissions)

Eight States and two territories (plus 40+ other nations)

- Diverse inputs (varying units, formats, sampling methods)
- Timeliness (some agencies don't always feel the same urgency)



Summary

Five primary management bodies (plus two commissions)

Eight States and two territories (plus 40+ other nations)

Diverse, multispecies fisheries

- > 250 stocks in FMPs
- > 40 distinct fisheries / gears
- ~2 billion pounds (20% of nation)



NOAA FISHERIES

Summary

Five primary management bodies (plus two commissions)

Eight States and two territories (plus 40+ other nations)

Diverse, multispecies fisheries

Huge Recreational Fishery (> all other jurisdictions combined)

- Nearly 42 million trips (57% of nation)



Summary

Five primary management bodies (plus two commissions)

Eight States and two territories (plus 40+ other nations)

Diverse, multispecies fisheries

Huge Recreational Fishery (> all other jurisdictions combined)

Discard rates are generally large and poorly known

- Regulatory discards often exceed the landings
- Discard data mostly self-reported.
- Observer coverage, when available, is < 10%.
- Large bycatch from the shrimp fishery



Summary

Five primary management bodies (plus two commissions)

Eight States and two territories (plus 40+ other nations)

Diverse, multispecies fisheries

Huge Recreational Fishery (> all other jurisdictions combined)

Discard rates are generally large and poorly known

Many pieces of data

- No long time series (except commercial landings)
- Most fisheries heavily exploited before most data collection programs began
- Heavy reliance on Fishery CPUE
- Lots of short-term studies

